Programmable TI 58/59 Specialty Pakettes

Marketing/Sales

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THE TI-59 PAKETTE STORY

Since the early days of handheld programmable calculators, Texas Instruments (TI) has been deeply involved in supplying not only calculators with exceptional power but also programs (software) to match. Many experts were put to work within their special fields of endeavor to design quality Software Libraries for TI calculator users. Among the Libraries produced by TI for the TI-59 are:

- Statistics
- Real Estate and Investment
- Surveying
- Navigation
- Farming
- Math/Utilities
- Aviation
- Leisure
- Business Decisions
- Securities Analysis
- Electrical Engineering
- RPN Simulator

Fully recognizing TI-59 users may require programs other than those included in TI-59 Libraries, a second program source was developed. This source, the Professional Program Exchange, gathers, compiles and redistributes programs **written by TI-59 users** who defined their own specific program needs and filled these needs by writing programs. These programs, now in Pakettes, add a new dimension to the software made available to TI-59 user. Combining some of the best TI originated programs with the most popular programs found in the Professional Program Exchange, Program Pakettes offer a true software value. Current TI Pakette offerings include:

- Securities
- Statistical Testing
- Civil Engineering
- Electronic Engineering
- Blackbody
- Oil/Gas/Energy
- Printer Utility
- Astrology
- Programming Aids
- 59 Fun
- 3-D Graphics
- Fluid Dynamics
- Mathematics
- Lab Chemistry
- Production Planning
- Marketing/Sales

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PPX-59
professional program exchange

TEXAS INSTRUMENTS
Calculator Products Division

Submission Abstract

Program Title
BREAK-EVEN POINT/MARGIN OF SAFETY

Rev.

Abstract of Program

This program computes the break-even point in units and dollars, and then computes the margin of safety given various unit and dollar sales expectations.

Original SR-52 Program written by Louis A. Martinez of San Francisco, Calif.

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User Benefits:

This program is useful in financial planning and analysis of some accounting reports.

Category Number 01	Required Progs.	Prog. Steps 349	PC-100A Needed ☐ Library Module ID ☐

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Name Texas Instruments Tel. No. _____

Address _____

City _____ State _____ Zip _____

Submission Checklist

- ☐ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing
- ☐ _____
- ☐ _____

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Program Description

Program Title: BREAK-EVEN POINT/MARGIN OF SAFETY

Rev.

Method, Equations, Sketches, Limitations, References, Error Recovery:

This program computes the break-even point in units and dollars, and then computes the margin of safety, given various sales expectations. The input variables are F = Fixed expenses, V = Variable expense per unit, S = Sales price per unit, E_d = Expected or desired sales in dollars, and E_u = Expected or desired sales in units. The marginal income per unit and marginal income ratio are computed from the following formulas:

Marginal income per unit = M = S - V
Marginal income ratio = R = (S - V)/S

The formula for the break-even point (when revenue equals expenses) in dollars is $BEP_d = F/R$, and in units is $BEP_u = F/M$.

The profit or loss (negative value) from expected dollar sales is $P_d = RE_d - F$, and from expected unit sales is $P_u = ME_u - F$.

The margin of safety, which is the amount in percent by which sales can decline before reaching the break-even point, for expected dollar sales is $MS_d = (E_d - BE_d)/E_d$, and for expected unit sales is $MS_u = (E_u - BEP_u)/E_u$. A negative value for the margin at safety has no meaning other than as an indication that sales are below the level necessary to break even.

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☐ See Continuation Sheet

0 1 8 0 0 1
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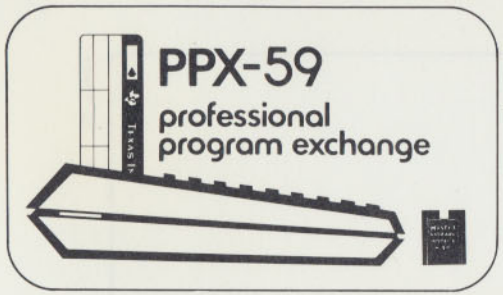

User Instructions

Program Title
BREAK-EVEN POINT/MARGIN OF SAFETY

Int.	S		P or L_d	MS_u
F	V	BEP	P or L_d	MS_u

Partition (OP 17): 399.69*
Parentheses Levels: _____
t Register: ☒
Angular Mode (if applicable): _____
SBR Levels: 1
Absolute Addresses: ☐
Library Module ID: _____
*For TI-58 399.09
Disturbs Pending Operations: ☒

LABELS (Op 08)

INV	lnx	CE	CLR	x:t	x²
√x	1/x	STO	RCL	SUM	yˣ
EE	(	)	÷	GTO	×
SBR	−	RST	+	R/S	•
+/−	=	CLR	INV	log	CP
tan	Pgm	P→R	sin	cos	CMs
Exc	Prd	|x|	Eng	Fix	Int
Deg	Pause	x=t	Nop	Op	Rad
Lbl	x≠t	Σ+	x̄	Grad	St flg
If flg	D.MS	π	List	Write	Dsz
Adv	Prt				

USER DEFINED KEYS

A	Fixed Expenses
B	Variable Expenses
C	Comp.Break-Evn Pt
D	Comp.Prof or Loss
E	Comp. Marg $Safe_d$
A'	Initialize
B'	Sales price/unit
C'	Used
D'	Comp. Prof or Loss
E'	Compute M $Safety_u$

FLAGS	0	1	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)
	Enter Program			
	Initialize		A'	0
	Enter Fixed Expense	F	A	F*
	Enter Variable Expenses per Unit	V	B	V*
	Enter Sales Price per Unit	S	B'	S*
	Compute Break-Even Point in dollars		C	BEPd*
	Compute Break-Even Point in Units		R/S	BEPu*
	Enter expected dollars sales and compute profit or loss	Ed	D	(Ed)* Pd*
	Compute margin of safety on expected dollar sales		E	MSd*
0	Enter expected unit sales and compute profit or loss	E_u	D'	(E_u)* P_u*
1	Compute Margin of Safety on expected Unit Sales		E'	MS_u*

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

DATA REGISTERS (INV List)

0	
1	Fixed Expenses
2	Variable Exp/Unit
3	Sales Price/Unit
4	Marg.Income/Unit
5	Mag. income ratio
6	BEPu
7	BEPd
8	Expected d sales
9	Expected u sales
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

☐ See Continuation Sheet

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Sample Problem

Statement of Example

A publishing company sells books for $10 each. It has fixed expenses of $1,000,000 and variable expenses of $8 per book. Find the break-even point in dollars and units. What will the profit or loss and the margin of safety be if the company expects (a) sales of $10,000,000 (b) sales of 400,000 books.

☐ See Continuation Sheet

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ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
	A'	(BREAK-EVEN PT.)*		
		(MARG OF SAFETY)*		
1,000,000	A	1000000.00*	(FIX)*	
8	B	8.00*	(VAR)*	
10	B'	10.00*	(PRIC)*	
	C	(BREAK-EVEN PT./DOLL)*		
		5000000.00*		
	R/S	(BREAK-EVEN PT./UNIT)*		
		500000.*		
10,000,000	D	(10000000.00)*	(DSAL)*	
		1000000.00*	(PROF)*	
	E	(MARG OF SAFETY)*		
		0.50*		
400,000	D'	(400000.)*	(USAL)*	
		200000.*	(LOSS)*	
	E'	(MARG OF SAFETY)*		
		-0.25*		

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

☐ Over

PPX-59 Professional Program Exchange

0 1 8 0 0 1
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LOC	CODE	KEY	COMMENTS
000	76	LBL	
001	16	A'	
002	22	INV	
003	58	FIX	
004	22	INV	
005	57	ENG	
006	22	INV	
007	52	EE	
008	06	6	
009	69	OP	
010	17	17	
011	47	CMS	
012	07	7	
013	69	OP	
014	17	17	
015	69	OP	
016	00	00	
017	43	RCL	
018	60	60	
019	69	OP	
020	01	01	
021	43	RCL	
022	61	61	
023	69	OP	
024	02	02	
025	43	RCL	
026	62	62	
027	69	OP	
028	03	03	
029	69	OP	
030	05	05	
031	43	RCL	
032	65	65	
033	69	OP	
034	01	01	
035	43	RCL	
036	66	66	
037	69	OP	
038	02	02	
039	43	RCL	
040	67	67	
041	69	OP	
042	03	03	
043	69	OP	
044	05	05	
045	00	0	
046	98	ADV	
047	98	ADV	
048	25	CLR	
049	91	R/S	
050	76	LBL	
051	11	A	
052	42	STO	
053	01	01	
054	22	INV	

LOC	CODE	KEY	COMMENTS
055	58	FIX	
056	02	2	
057	01	1	
058	02	2	
059	04	4	
060	04	4	
061	04	4	
062	69	OP	
063	04	04	
064	43	RCL	
065	01	01	
066	58	FIX	
067	02	02	
068	69	OP	
069	06	06	
070	91	R/S	
071	76	LBL	
072	12	B	
073	42	STO	
074	02	02	
075	22	INV	
076	58	FIX	
077	04	4	
078	02	2	
079	01	1	
080	03	3	
081	03	3	
082	05	5	
083	69	OP	
084	04	04	
085	43	RCL	
086	02	02	
087	58	FIX	
088	02	02	
089	69	OP	
090	06	06	
091	91	R/S	
092	76	LBL	
093	17	B'	
094	42	STO	
095	03	03	
096	75	-	
097	43	RCL	
098	02	02	
099	95	=	
100	42	STO	
101	04	04	
102	55	÷	
103	43	RCL	
104	03	03	
105	95	=	
106	42	STO	
107	05	05	
108	22	INV	
109	58	FIX	

LOC	CODE	KEY	COMMENTS
110	03	3	
111	03	3	
112	03	3	
113	05	5	
114	02	2	
115	04	4	
116	01	1	
117	05	5	
118	69	OP	
119	04	04	
120	43	RCL	
121	03	03	
122	58	FIX	
123	02	02	
124	69	OP	
125	06	06	
126	91	R/S	
127	91	R/S	
128	76	LBL	
129	13	C	
130	43	RCL	
131	01	01	
132	55	÷	
133	43	RCL	
134	05	05	
135	95	=	
136	42	STO	
137	07	07	
138	22	INV	
139	58	FIX	
140	98	ADV	
141	43	RCL	
142	60	60	
143	69	OP	
144	01	01	
145	43	RCL	
146	61	61	
147	69	OP	
148	02	02	
149	43	RCL	
150	62	62	
151	69	OP	
152	03	03	
153	43	RCL	
154	63	63	
155	69	OP	
156	04	04	
157	69	OP	
158	05	05	
159	58	FIX	
160	02	02	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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LOC	CODE	KEY	COMMENTS
161	43	RCL	
162	07	07	
163	99	PRT	
164	98	ADV	
165	91	R/S	
166	43	RCL	
167	01	01	
168	55	÷	
169	43	RCL	
170	04	04	
171	95	=	
172	42	STO	
173	06	06	
174	22	INV	
175	58	FIX	
176	43	RCL	
177	64	64	
178	69	OP	
179	04	04	
180	69	OP	
181	05	05	
182	43	RCL	
183	06	06	
184	99	PRT	
185	98	ADV	
186	91	R/S	
187	76	LBL	
188	14	D	
189	42	STO	
190	08	08	
191	22	INV	
192	58	FIX	
193	01	1	
194	06	6	
195	03	3	
196	06	6	
197	01	1	
198	03	3	
199	02	2	
200	07	7	
201	69	OP	
202	04	04	
203	43	RCL	
204	08	08	
205	58	FIX	
206	02	02	
207	69	OP	
208	06	06	
209	65	×	
210	43	RCL	
211	05	05	
212	75	-	
213	43	RCL	
214	01	01	
215	95	=	

LOC	CODE	KEY	COMMENTS
216	18	C'	
217	91	R/S	
218	76	LBL	
219	15	E	
220	53	(	
221	43	RCL	
222	08	08	
223	75	-	
224	43	RCL	
225	07	07	
226	54	)	
227	55	÷	
228	43	RCL	
229	08	08	
230	95	=	
231	71	SBR	
232	69	OP	
233	91	R/S	
234	76	LBL	
235	19	D'	
236	98	ADV	
237	42	STO	
238	08	08	
239	22	INV	
240	58	FIX	
241	04	4	
242	01	1	
243	03	3	
244	06	6	
245	01	1	
246	03	3	
247	02	2	
248	07	7	
249	69	OP	
250	04	04	
251	43	RCL	
252	08	08	
253	69	OP	
254	06	06	
255	65	×	
256	43	RCL	
257	04	04	
258	75	-	
259	43	RCL	
260	01	01	
261	95	=	
262	18	C'	
263	91	R/S	
264	76	LBL	
265	10	E'	
266	54	)	
267	43	RCL	
268	08	08	
269	75	-	
270	43	RCL	

LOC	CODE	KEY	COMMENTS
271	06	06	
272	54	)	
273	55	÷	
274	43	RCL	
275	08	08	
276	95	=	
277	71	SBR	
278	69	OP	
279	91	R/S	
280	76	LBL	
281	18	C'	
282	22	INV	
283	58	FIX	
284	29	CP	
285	77	GE	
286	94	+/-	
287	32	X:T	
288	02	2	
289	07	7	
290	03	3	
291	02	2	
292	03	3	
293	06	6	
294	03	3	
295	06	6	
296	69	OP	
297	04	04	
298	32	X:T	
299	94	+/-	
300	69	OP	
301	06	06	
302	92	RTN	
303	76	LBL	
304	94	+/-	
305	32	X:T	
306	03	3	
307	03	3	
308	03	3	
309	05	5	
310	03	3	
311	02	2	
312	02	2	
313	01	1	
314	69	OP	
315	04	04	
316	32	X:T	
317	58	FIX	
318	02	02	
319	69	OP	
320	06	06	
321	92	RTN	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
322	76	LBL									
323	69	OP									
324	98	ADV									
325	22	INV									
326	58	FIX									
327	32	X:T									
328	69	OP									
329	00	00									
330	43	RCL									
331	65	65									
332	69	OP									
333	01	01									
334	43	RCL									
335	66	66									
336	69	OP									
337	02	02									
338	43	RCL									
339	67	67									
340	69	OP									
341	03	03									
342	69	OP									
343	05	05									
344	32	X:T									
345	58	FIX									
346	02	02									
347	99	PRT									
348	92	RTN									

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Out of Learn Mode key in the following alphanumeric codes and store in corresponding register

Alphanumerics	Reg.
14351713.	60
2620174217.	61
3100333740.	62
6316322727.	63
6341312437.	64
30133522.	65
32210036.	66
1321173745.	67

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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TEXAS INSTRUMENTS
Calculator Products Division

Submission Abstract

Program Title	Rev.
PRODUCT PRICING PROGRAM	NC

Abstract of Program

Program performs pricing work-ups given any number of variable cost/labor/overhead inputs. Output lists pricing information followed by a listing of cost, labor, and overhead inputs.

Original TI-59 Program by Wayne Stewart, Sherman, TX.

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User Benefits:

Automatic price calculation with 100% variable inputs.
Output is a PC100A listing with input assumptions.
Program is compatible with the government's DD633 pricing form.

Category Number	Required Progs.	Prog. Steps	PC-100A Needed ☒ Library Module ID ☐
01	N/A	639	

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Submission Checklist

- ☐ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing
- ☐ _____
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Program Description

Program Title: PRODUCT PRICING PROGRAM	Rev.

Method, Equations, Sketches, Limitations, References, Error Recovery:

Program takes cost inputs, in the form of direct material dollars, Engineering manmonths, Field Service Manmonths, Manufacturing Engineering manmonths, direct anufacturing hours, and other cost dollars, it applies appropriate labor rate, material adders, overhead, G & A, fee, and CAS factors (initially input as variables), and calculates a final price. The PC100A tape output lists the cost factors and then lists the cost inputs used to formulate the price.

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☐ See Continuation Sheet

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User Instructions

Program Title
PRODUCT PRICING PROGRAM

Mtl.Add	Eng.LR	Mfg.ELR	Mfg.LR	FS LR
Drt.Mtl.	Eng.MM	Mfg.EM	Mfg.LH	FS MM

Partition (OP 17): 639.39
Parentheses Levels: 1
t Register ☐
Angular Mode (if applicable): NA
SBR Levels: NA
Absolute Addresses ☐
Library Module ID: NA
Disturbs Pending Operations ☐

LABELS (Op 08)

INV	lnx	CE	CLR	x:t	x²
√x	1/x	STO	RCL	SUM	yˣ
EE	(	)	÷	GTO	×
SBR	−	RST	+	R/S	•
+/−	=	CLR	INV	log	CP
tan	Pgm	P→R	sin	cos	GMs
Exc	Prd	|x|	Eng	Fix	Int
Deg	Pause	x=t	Nop	Op	Rad
Lbl	x≠t	Σ+	x̄	Grad	St flg
If flg	D.MS	π	x	List	Write	Dsz
Adv	Prt				

USER DEFINED KEYS

A Direct Material
B Engr Manmonths
C Mfg Engr Manmonths
D Mfg Labor Hours
E Field Service MM
A' Mat'l Adders %
B' Engr Labor Rate($/MM)
C' Mfg Eng Labor Rate($/MM)
D' Mfg Labor Rate ($/HR)
E' Field Service Labor Rate ($/MM)

FLAGS	0	1	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS			OUTPUT/MODE (see legend below)
1	REPARTITION MEMORY	4	2nd	OP	17	639.39
2	READ CARDS (SIDES 1, 2, 3, 4)					
3	ENTER DIRECT MATERIAL COST	XXX			A	XXX
4	ENTER ENGINEERING MAN-MONTHS	XXX			B	XXX
5	ENTER MANUFACTURING ENGINEERING MAN-MONTHS	XXX			C	XXX
6	ENTER MANUFACTURING LABOR HOURS	XXX			D	XXX
7	ENTER FIELD SERVICE MAN-MONTHS	XXX			E	XXX
8	ENTER MATERIAL ADDERS PERCENTAGE	.XXX		2nd	A'	.XXX
9	ENTER ENGINEERING LABOR RATE ($/MM)	XXXX		2nd	B'	XXXX
10	ENTER MANUFACTURING ENGINEERING RATE ($/MM)	XXXX		2nd	C'	XXXX
11	ENTER MANUFACTURING LABOR RATE ($/HR)	X.XXX		2nd	D'	X.XXX
12	ENTER FIELD SERVICE LABOR RATE ($/MM)	XXXX		2nd	E'	XXXX
13	ENTER OTHER COSTS ($)	XXXX		STO	31	XXXX
14	ENTER MATERIAL OVERHEAD RATE (%)	.XXX		STO	11	.XXX
15	ENTER ENGINEERING OVERHEAD RATE (%)	X.XXX		STO	12	X.XXX
16	ENTER MANUFACTURING OVERHEAD RATE (%)	X.XXX		STO	13	X.XXX

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

DATA REGISTERS (INV List)

0
1
2 See continuation
3 sheet 2
4
5
6
7
8
9
0
1
2
3
4
5
6
7
8
9

See Continuation Sheet

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Continued From: ☐ Program Description ☒ User Instructions ☐ Stmt. of Example

Program Title: PRODUCT PRICING PROGRAM

Rev.

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE
17	ENTER FIELD SERVICE OVERHEAD RATE	.XXX	STO 14	.XXX
18	ENTER G & A RATE (%)	.XXX	STO 15	.XXX
19	ENTER FEE PERCENTAGE	.XXX	STO 16	.XXX
20	ENTER CAS MATERIAL ADDER (%)	.XXXXX	STO 17	.XXXXX
21	ENTER CAG ENGINEERING ADDER (%)	.XXXXX	STO 18	.XXXXX
22	ENTER CAS MANUFACTURING ADDER (%)	.XXXXX	STO 19	.XXXXX
23	ENTER CAS FIELD SERVICE ADDER (%)	.XXXXX	STO 20	.XXXXX
24	ENTER CAS G & A ADDER (%)	.XXXXX	STO 21	.XXXXX
25	RESET	------	RST	------
26	RUN PROGRAM	------	R/S	------

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FOR SUBSEQUENT CALCULATIONS, ALL UNCHANGED DATA INPUTS MAY BE SKIPPED. INPUT ONLY THOSE ITEMS WHICH CHANGED.

DATA REGISTERS

LOCATION	REFERENCED BY	
00		STORE OP CODE "OVHD" LABEL
01	A	STORE DIRECT MATERIAL DOLLARS
02	B	STORE ENGINEERING MAN-MONTHS
03	C	STORE MANUFACTURING ENGINEERING MAN-MONTHS
04	D	STORE MANUFACTURING LABOR HOURS
05	E	STORE FIELD SERVICE MAN-MONTHS
06	A'	STORE MATERIAL ADDERS PERCENTAGE
07	B'	STORE ENGINEERING LABOR RATE
08	C'	STORE MANUFACTURING ENGINEERING LABOR RATE
09	D'	STORE MANUFACTURING HOURLY RATE

Continued From: ☐ Program Description ☐ User Instructions ☐ Stmt. of Example

Program Title: | Rev.

LOCATION	REFERENCED BY	
10	E'	STORE FIELD SERVICE LABOR RATE
11		STORE MATERIAL OVERHEAD PERCENTAGE
12		STORE ENGINEERING OVERHEAD PERCENTAGE
13		STORE MANUFACTURING OVERHEAD PERCENTAGE
14		STORE FIELD SERVICE OVERHEAD PERCENTAGE
15		STORE G & A PERCENTAGE
16		STORE FEE PERCENTAGE
17		STORE CAS MATERIAL PERCENTAGE
18		STORE CAS ENGINEERING PERCENTAGE
19		STORE CAS MANUFACTURING PERCENTAGE
20		STORE CAS FIELD SERVICE PERCENTAGE
21		STORE CAS G & A PERCENTAGE
22		STORE SUM OF MATERIAL AND MATERIAL ADDERS ($)
23		STORE MATERIAL OVERHEAD ($)
24		STORE ENGINEERING COST ($)
25		STORE ENGINEERING OVERHEAD ($)
26		STORE MANUFACTURING ENGINEERING COST ($)
27		STORE MANUFACTURING LABOR COST ($)
28		STORE MANUFACTURING OVERHEAD ($)
29		STORE FIELD SERVICE COST ($)
30		STORE FIELD SERVICE OVERHEAD ($)
31		STORE OTHER COSTS ($)
32		STORE COST SUBTOTAL (SUM OF 22 - 31)
33		STORE G & A ($)
34		STORE COST & G & A SUBTOTAL (32 + 33)

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Continued From: ☐ Program Description ☐ User Instructions ☐ Stmt. of Example

Program Title:	Rev.

LOCATION	REFERENCED BY
35	STORE FEE ($)
36	STORE TOTAL COST, G & A, AND FEE ($) (34 + 35)
37	STORE CAS ($)
38	STORE PRICE ($)
39	STORE OP CODE FOR "RATE" LABEL

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Sample Problem

Statement of Example ASSUME A PROPOSAL FOR 10,000 WIDGETS HAS THE FOLLOWING ELEMENTS.

MATERIAL		$50,000 + 12% ADDERS + 4.5% OVERHEAD
ENGINEERING LABOR		100 MM @ $1500/MM + 102% OVERHEAD
MANUFACTURING ENGINEERING LABOR		50 MM @ $1250/MM + 128% OVERHEAD
MANUFACTURING LABOR		10,000 HOURS @ $5.00/hr + 128% OVERHEAD
FIELD SERVICE		12 MM @ $1600/MM + 36% OVERHEAD
OTHER COSTS		$18,000
G & A		16.1%
FEE		15.0%
CAS ADDERS:	MATERIAL	.00021%
	ENGINEERING LABOR	.02643%
	MANUFACTURING LABOR	.03824%
	FIELD SERVICE	.00540%
	G & A	.00006%

☐ See Continuation Sheet

ENTER	PRESS	OUTPUT/MODE (see legend below)	COMMENT
4	2nd OP17	639.39	REPARTITION
-----	--------	------	READ CARDS (SIDES 1 - 4)
50000	A	50000	ENTER MAT'L ($)
100	B	100	ENTER ENGR (MM)
50	C	50	ENTER MFG ENGR (MM)
10000	D	10000	ENTER MFG LABOR (HR)
12	E	12	ENTER FIELD SERVICE (MM)
.12	2nd A'	.12	ENTER MAT'L ADDERS (%)
1500	2nd B'	1500	ENTER ENGR LABOR RATE ($/MM)
1250	2nd C'	1250	ENTER MFG ENGR LABOR RATE ($/MM)
5.00	2nd D'	5.00	ENTER MFG HOURLY RATE ($/HR)
1600	2nd E'	1600	ENTER FIELD SERVICE LABOR RATE ($/MM)

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☒ Over

ENTER	PRESS	OUTPUT/MODE (see legend below)	COMMENT
18000	STO 31	18000	ENTER OTHER COSTS($)
.045	STO 11	.045	ENTER MAT'L OVHD RATE (%)
1.02	STO 12	1.02	ENTER ENGR OVHD RATE (%)
1.28	STO 13	1.28	ENTER MFG OVHD RATE (%)
.36	STO 14	.36	ENTER FIELD SERVICE OVHD RATE (%)
.161	STO 15	.161	ENTER G & A RATE (%)
.15	STO 16	.15	ENTER FEE PERCENTAGE (%)
.00021	STO 17	.00021	ENTER CAS MAT'L RATE (%)
.02643	STO 18	.02643	ENTER CAS ENGR RATE (%)
.03824	STO 19	.03824	ENTER CAS MFG RATE (%)
.0054	STO 20	.0054	ENTER CAS FIELD SERVICE RATE (%)
.00006	STO 21	.00006	ENTER CAS G & A RATE (%)
-----	RST	-----	RESET
-----	R/S	-----	RUN PROGRAM

The output for this problem is shown on page

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(n)* — Printed and displayed

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ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
		56000.	MATL	The top section is a listing of the complete DD633 - format pricing summary
		2520.	OVHD	
		150000.	ENGR	
		153000.	OVHD	
		62500.	MENG	
		50000.	MFG	
		144000.	OVHD	
		19200.	F/S	
		6912.	OVHD	
		18000.	OTHR	
		662132.	S/T	
		106603.252	G*A	
		768735.252	S/T	
		115310.2878	FEE	
		8421.66792	CAS	
		892467.2077	PRIC	
		0.12	MADD	The bottom section lists inputs used in making the price work-up.
		100.	E MM	
		1500.	RATE	
		50.	MEMM	
		1250.	RATE	
		10000.	MHRS	
		5.	RATE	
		12.	FSMM	
		1600.	RATE	
		0.045	MATL	
		1.02	ENGR	
		1.28	MFG	
		0.36	F/S	
		0.161	G*A	
		0.15	FEE	

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PPX-59 Professional Program Exchange

0 1 8 0 0 2
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LOC	CODE	KEY	COMMENTS
000	61	GTO	
001	89	π	
002	76	LBL	
003	11	A	
004	42	STO	
005	01	01	
006	91	R/S	
007	76	LBL	
008	12	B	
009	42	STO	
010	02	02	
011	91	R/S	
012	76	LBL	
013	13	C	
014	42	STO	
015	03	03	
016	91	R/S	
017	76	LBL	
018	14	D	
019	42	STO	
020	04	04	
021	91	R/S	
022	76	LBL	
023	15	E	
024	42	STO	
025	05	05	
026	91	R/S	
027	76	LBL	
028	16	A'	
029	42	STO	
030	06	06	
031	91	R/S	
032	76	LBL	
033	17	B'	
034	42	STO	
035	07	07	
036	91	R/S	
037	76	LBL	
038	18	C'	
039	42	STO	
040	08	08	
041	91	R/S	
042	76	LBL	
043	19	D'	
044	42	STO	
045	09	09	
046	91	R/S	
047	76	LBL	
048	10	E'	
049	42	STO	
050	10	10	
051	91	R/S	
052	76	LBL	
053	89	π	
054	43	RCL	
055	01	01	
056	65	×	
057	53	(	
058	01	1	
059	85	+	
060	43	RCL	
061	06	06	
062	54	)	
063	95	=	
064	42	STO	
065	22	22	
066	03	3	
067	00	0	
068	01	1	
069	03	3	
070	03	3	
071	07	7	
072	02	2	
073	07	7	
074	69	OP	
075	04	04	
076	43	RCL	
077	22	22	
078	69	OP	
079	06	06	
080	43	RCL	
081	22	22	
082	65	×	
083	43	RCL	
084	11	11	
085	95	=	
086	42	STO	
087	23	23	
088	03	3	
089	02	2	
090	04	4	
091	02	2	
092	02	2	
093	03	3	
094	01	1	
095	06	6	
096	42	STO	
097	00	00	
098	69	OP	
099	04	04	
100	43	RCL	
101	23	23	
102	69	OP	
103	06	06	
104	43	RCL	
105	02	02	
106	65	×	
107	43	RCL	
108	07	07	
109	95	=	
110	42	STO	
111	24	24	
112	01	1	
113	07	7	
114	03	3	
115	01	1	
116	02	2	
117	02	2	
118	03	3	
119	05	5	
120	69	OP	
121	04	04	
122	43	RCL	
123	24	24	
124	69	OP	
125	06	06	
126	43	RCL	
127	24	24	
128	65	×	
129	43	RCL	
130	12	12	
131	95	=	
132	42	STO	
133	25	25	
134	43	RCL	
135	00	00	
136	69	OP	
137	04	04	
138	43	RCL	
139	25	25	
140	69	OP	
141	06	06	
142	43	RCL	
143	03	03	
144	65	×	
145	43	RCL	
146	08	08	
147	95	=	
148	42	STO	
149	26	26	
150	03	3	
151	00	0	
152	01	1	
153	07	7	
154	03	3	
155	01	1	
156	02	2	
157	02	2	
158	69	OP	
159	04	04	
160	43	RCL	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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LOC	CODE	KEY	COMMENTS
161	26	26	
162	69	OP	
163	06	06	
164	43	RCL	
165	04	04	
166	65	×	
167	43	RCL	
168	09	09	
169	95	=	
170	42	STO	
171	27	27	
172	00	0	
173	00	0	
174	03	3	
175	00	0	
176	02	2	
177	01	1	
178	02	2	
179	02	2	
180	69	OP	
181	04	04	
182	43	RCL	
183	27	27	
184	69	OP	
185	06	06	
186	43	RCL	
187	26	26	
188	85	+	
189	43	RCL	
190	27	27	
191	95	=	
192	65	×	
193	43	RCL	
194	13	13	
195	95	=	
196	42	STO	
197	28	28	
198	43	RCL	
199	00	00	
200	69	OP	
201	04	04	
202	43	RCL	
203	28	28	
204	69	OP	
205	06	06	
206	43	RCL	
207	05	05	
208	65	×	
209	43	RCL	
210	10	10	
211	95	=	
212	42	STO	
213	29	29	
214	00	0	
215	00	0	

LOC	CODE	KEY	COMMENTS
216	02	2	
217	01	1	
218	06	6	
219	03	3	
220	03	3	
221	06	6	
222	69	OP	
223	04	04	
224	43	RCL	
225	29	29	
226	69	OP	
227	06	06	
228	43	RCL	
229	29	29	
230	65	×	
231	43	RCL	
232	14	14	
233	95	=	
234	42	STO	
235	30	30	
236	43	RCL	
237	00	00	
238	69	OP	
239	04	04	
240	43	RCL	
241	30	30	
242	69	OP	
243	06	06	
244	03	3	
245	02	2	
246	03	3	
247	07	7	
248	02	2	
249	03	3	
250	03	3	
251	05	5	
252	69	OP	
253	04	04	
254	43	RCL	
255	31	31	
256	69	OP	
257	06	06	
258	43	RCL	
259	22	22	
260	85	+	
261	43	RCL	
262	23	23	
263	85	+	
264	43	RCL	
265	24	24	
266	85	+	
267	43	RCL	
268	25	25	
269	85	+	
270	43	RCL	

LOC	CODE	KEY	COMMENTS
271	26	26	
272	85	+	
273	43	RCL	
274	27	27	
275	85	+	
276	43	RCL	
277	28	28	
278	85	+	
279	43	RCL	
280	29	29	
281	85	+	
282	43	RCL	
283	30	30	
284	85	+	
285	43	RCL	
286	31	31	
287	95	=	
288	42	STO	
289	32	32	
290	00	0	
291	00	0	
292	03	3	
293	06	6	
294	06	6	
295	03	3	
296	03	3	
297	07	7	
298	69	OP	
299	04	04	
300	43	RCL	
301	32	32	
302	69	OP	
303	06	06	
304	43	RCL	
305	32	32	
306	65	×	
307	43	RCL	
308	15	15	
309	95	=	
310	42	STO	
311	33	33	
312	02	2	
313	02	2	
314	05	5	
315	01	1	
316	01	1	
317	03	3	
318	69	OP	
319	04	04	
320	43	RCL	
321	33	33	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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LOC	CODE	KEY	COMMENTS
322	69	OP	
323	06	06	
324	43	RCL	
325	32	32	
326	85	+	
327	43	RCL	
328	33	33	
329	95	=	
330	42	STO	
331	34	34	
332	03	3	
333	06	6	
334	06	6	
335	03	3	
336	03	3	
337	07	7	
338	69	OP	
339	04	04	
340	43	RCL	
341	34	34	
342	69	OP	
343	06	06	
344	43	RCL	
345	34	34	
346	65	×	
347	43	RCL	
348	16	16	
349	95	=	
350	42	STO	
351	35	35	
352	02	2	
353	01	1	
354	01	1	
355	07	7	
356	01	1	
357	07	7	
358	69	OP	
359	04	04	
360	43	RCL	
361	35	35	
362	69	OP	
363	06	06	
364	43	RCL	
365	34	34	
366	85	+	
367	43	RCL	
368	35	35	
369	95	=	
370	42	STO	
371	36	36	
372	43	RCL	
373	22	22	
374	65	×	
375	43	RCL	
376	17	17	

LOC	CODE	KEY	COMMENTS
377	85	+	
378	43	RCL	
379	24	24	
380	65	×	
381	43	RCL	
382	18	18	
383	85	+	
384	53	(	
385	43	RCL	
386	26	26	
387	85	+	
388	43	RCL	
389	27	27	
390	54	)	
391	65	×	
392	43	RCL	
393	19	19	
394	85	+	
395	43	RCL	
396	29	29	
397	65	×	
398	43	RCL	
399	20	20	
400	85	+	
401	43	RCL	
402	32	32	
403	65	×	
404	43	RCL	
405	21	21	
406	95	=	
407	42	STO	
408	37	37	
409	01	1	
410	05	5	
411	01	1	
412	03	3	
413	03	3	
414	06	6	
415	69	OP	
416	04	04	
417	43	RCL	
418	37	37	
419	69	OP	
420	06	06	
421	43	RCL	
422	36	36	
423	85	+	
424	43	RCL	
425	37	37	
426	95	=	
427	42	STO	
428	38	38	
429	03	3	
430	03	3	
431	03	3	

LOC	CODE	KEY	COMMENTS
432	05	5	
433	02	2	
434	04	4	
435	01	1	
436	05	5	
437	69	OP	
438	04	04	
439	43	RCL	
440	38	38	
441	69	OP	
442	06	06	
443	98	ADV	
444	98	ADV	
445	98	ADV	
446	03	3	
447	05	5	
448	01	1	
449	03	3	
450	03	3	
451	07	7	
452	01	1	
453	07	7	
454	42	STO	
455	39	39	
456	03	3	
457	00	0	
458	01	1	
459	03	3	
460	01	1	
461	06	6	
462	01	1	
463	06	6	
464	69	OP	
465	04	04	
466	43	RCL	
467	06	06	
468	69	OP	
469	06	06	
470	01	1	
471	07	7	
472	00	0	
473	00	0	
474	03	3	
475	00	0	
476	03	3	
477	00	0	
478	69	OP	
479	04	04	
480	43	RCL	
481	02	02	
482	69	OP	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
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LOC	CODE	KEY	COMMENTS
483	06	06	
484	43	RCL	
485	39	39	
486	69	OP	
487	04	04	
488	43	RCL	
489	07	07	
490	69	OP	
491	06	06	
492	03	3	
493	00	0	
494	01	1	
495	07	7	
496	03	3	
497	00	0	
498	03	3	
499	00	0	
500	69	OP	
501	04	04	
502	43	RCL	
503	03	03	
504	69	OP	
505	06	06	
506	43	RCL	
507	39	39	
508	69	OP	
509	04	04	
510	43	RCL	
511	08	08	
512	69	OP	
513	06	06	
514	03	3	
515	00	0	
516	02	2	
517	03	3	
518	03	3	
519	05	5	
520	03	3	
521	06	6	
522	69	OP	
523	04	04	
524	43	RCL	
525	04	04	
526	69	OP	
527	06	06	
528	43	RCL	
529	39	39	
530	69	OP	
531	04	04	
532	43	RCL	
533	09	09	
534	69	OP	
535	06	06	
536	02	2	
537	01	1	

LOC	CODE	KEY	COMMENTS
538	03	3	
539	06	6	
540	03	3	
541	00	0	
542	03	3	
543	00	0	
544	69	OP	
545	04	04	
546	43	RCL	
547	05	05	
548	69	OP	
549	06	06	
550	43	RCL	
551	39	39	
552	69	OP	
553	04	04	
554	43	RCL	
555	10	10	
556	69	OP	
557	06	06	
558	98	ADV	
559	03	3	
560	00	0	
561	01	1	
562	03	3	
563	03	3	
564	07	7	
565	02	2	
566	07	7	
567	69	OP	
568	04	04	
569	43	RCL	
570	11	11	
571	69	OP	
572	06	06	
573	01	1	
574	07	7	
575	03	3	
576	01	1	
577	02	2	
578	02	2	
579	03	3	
580	05	5	
581	69	OP	
582	04	04	
583	43	RCL	
584	12	12	
585	69	OP	
586	06	06	
587	03	3	
588	00	0	
589	02	2	
590	01	1	
591	02	2	
592	02	2	

LOC	CODE	KEY	COMMENTS
593	69	OP	
594	04	04	
595	43	RCL	
596	13	13	
597	69	OP	
598	06	06	
599	02	2	
600	01	1	
601	06	6	
602	03	3	
603	03	3	
604	06	6	
605	69	OP	
606	04	04	
607	43	RCL	
608	14	14	
609	69	OP	
610	06	06	
611	02	2	
612	02	2	
613	05	5	
614	01	1	
615	01	1	
616	03	3	
617	69	OP	
618	04	04	
619	43	RCL	
620	15	15	
621	69	OP	
622	06	06	
623	02	2	
624	01	1	
625	01	1	
626	07	7	
627	01	1	
628	07	7	
629	69	OP	
630	04	04	
631	43	RCL	
632	16	16	
633	69	OP	
634	06	06	
635	91	R/S	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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Submission Abstract

Program Title	Rev.
GOMPERTZ GROWTH FUNCTION CURVE FIT	

Abstract of Program

This program fits a Gompertz Growth Curve to a given set of data. It also generates forecasted values for specific inputs. It facilitates estimates of market potential.

Original SR-52 Program written by John E. Dunn of Ames, Iowa

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User Benefits:

The program results in significant time savings, increases in accuracy, and error reductions over hand calculation methods.

Category Number 04	Required Progs.	Prog. Steps 272	PC-100A Needed ☐ Library Module ID ☐

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Name Texas Instruments Tel. No. _____

Address _____

City _____ State _____ Zip _____

Submission Checklist

- ☐ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing
- ☐ _____
- ☐ _____

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TEXAS INSTRUMENTS
Calculator Products Division

Program Description

Program Title: GOMPERTZ GROWTH FUNCTION CURVE FIT

Rev.

Method, Equations, Sketches, Limitations, References, Error Recovery:

This program fits a Gompertz Growth Curve of the form $Yt=Ka^{b^t}$ where:

Yt = Cumulative sales through period t
K = total market potential
a = a parameter
b = a parameter
t = The number of periods elapsed since the base period.

In order to fit the Gompertz Curve of $Yt = Ka^{b^t}$ to a set of historic data, the data must first be divided into three equal parts. This may necessitate deleting the first and/or second data points.

The formulas used to specify a, b, and K are:

1) $$b = \left(\frac{\Sigma_3 - \Sigma_2}{\Sigma_2 - \Sigma_1}\right)^{\frac{1}{n/3}}$$

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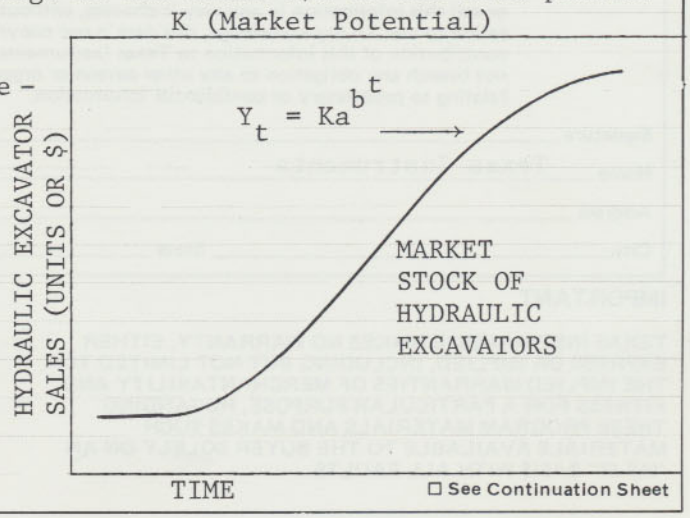
2) $$a = \text{Antilog}\left[(\Sigma_2 - \Sigma_1)\,\frac{b-1}{(b^{n/3}-1)^2}\right]$$

3) $$k = \text{Antilog}\left[\frac{1}{n/3}\cdot\frac{(\Sigma_1\cdot\Sigma_3)-\Sigma_2{}^2}{\Sigma_1+\Sigma_3-2\Sigma_2}\right]$$

Where: Σ_1 is the sum of the base 10 logs of the 1st 1/3 of the data points.
Σ_2 is the sum of the base 10 logs of the 2nd 1/3 of the data points.
and Σ_3 is the sum of the base 10 logs of the final 1/3 of the data points.

The growth curve (example at right) involves the cumulated sales over time - or the market stock of the product under study.

To forecast unit sales for future time periods merely de-cumulate the forcasted values resulting from the Gompertz Curve Fit Equation.



☐ See Continuation Sheet

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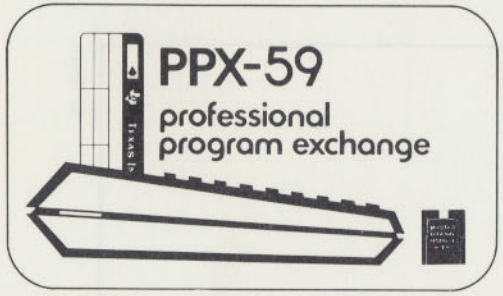

User Instructions

Program Title
GOMPERTZ GROWTH FUNCTION CURVE FIT

b	a	k	Y_{ti}	INIT.
1st 1/3 data	2nd 1/3 data	3rd 1/3 data		

Partition (OP 17): 479.59*
Parentheses Levels: 2
t Register: ☒
Angular Mode (if applicable):
SBR Levels:
Absolute Addresses: ☐
Library Module ID:
*For TI-58 319.19
Disturbs Pending Operations: ☒

LABELS (Op 08)

INV	ln x	CE	CLR	x⇄t	x²
√x	1/x	STO	RCL	SUM	y^x
EE	(	)	÷	GTO	×
SBR	−	RST	+	R/S	•
+/−	=	CLR	INV	log	CP
tan	Pgm	P→R	sin	cos	CMs
Exc	Prd	|x|	Eng	Fix	Int
Deg	Pause	x=t	Nop	Op	Rad
Lbl	x≠t	Σ+	x̄	Grad	St flg
If flg	D.MS	π	List	Write	Dsz
Adv	Prt				

USER DEFINED KEYS

A Enter 1st 1/3 data
B Enter 2nd 1/3 data
C Enter 3rd 1/3 data
D
E
A' Compute b
B' Compute a
C' Compute k
D' Y_{ti}
E' Initialize

FLAGS	0	1	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)
1	Initialize		E'	0
2	Enter 1st 1/3 of data	1st 1/3 data	A	(1st data)* ctr
3	Enter 2nd 1/3 of data	2nd 1/3 data	B	(2nd data)* ctr
4	Enter 3rd 1/3 of data	3rd 1/3 data	C	(3rd data)* ctr
5	Compute "b" exponent		A'	b*
6	Compute "a" coefficient		B'	a*
7	Compute "k" coefficient		C'	k*
8	To forecast Y_t values Enter time period values, ti	t_i	D'	(t_i)* Y_{t_i} *

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

DATA REGISTERS (INV List)

0 Σ_3
1 n
2 Used
3 Σ_2
4 a
5 n/3
6 Σ_1
7 k
8 b
9 Used
0
11 counter
2
3
4
5
6
7
8
9

☐ See Continuation Sheet

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0,4 8,0,0,1
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Sample Problem

Statement of Example

YEAR	OBSERVATION #	TIME PERIOD	UNIT SHIPMENTS HYDRAULIC EXCAVATORS	UNIT SHIPMENTS, CUMULATIVE	PREDICTED VALUES
~~1968~~			~~422~~ →	(Deleted to yield 3 equal parts)	
1969	1	0	534	534	557
1970	2	1	597	1131	1084
1971	3	2	719	1850	1842
1972	4	3	948	2798	2810
1973	5	4	1187	3985	3934
1974	6	5	1091	5076	5142

☐ See Continuation Sheet

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ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
	E'	0		Initialize
534	A	(534.)*	1	Enter 1st 1/3 data
597	A	(597.)*	2	
719	B	(719.)*	1	Enter 2nd 1/3 data
948	B	(948)*	2	
1187	C	(1187)*	1	Enter Final 1/3 data
1091	C	(1091)*	2	
	A'	.7965094122*	B	Compute value of b
	B'	0.037962515*	A	Compute value of a
	C'	14675.84136*	K	Compute value of k
0	D'	(0.)*	X	time period
		557.1318483*	Y	predicted value
1	D'	(1.)*	X	time period
		1084.04142*	Y	predicted value
2	D'	(2.)*	X	
		1842.074125*	Y	

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

☐ Over

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Sample Problem (cont'd)

ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
3	D'	(3.)*	X	time period
		2810.038927*	Y	predicated value
4	D'	(4.)*	X	
		3933.655575*	Y	
5	D'	(5.)*	X	
		5142.254986*	Y	
6	D'	(6.)*	X	
		6365.511019*	Y	
7	D'	(7.)*	X	time period
		7544.900221*	Y	predicated value
8	D'	(8.)*	X	
		8638.77188*	Y	
9	D'	(9.)*	X	
		9622.44791*	Y	

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

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0	4	8	0	0	1

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LOC	CODE	KEY	COMMENTS
000	76	LBL	
001	10	E'	
002	22	INV	
003	58	FIX	
004	22	INV	
005	57	ENG	
006	25	CLR	
007	06	6	
008	69	OP	
009	17	17	
010	47	CMS	
011	25	CLR	
012	91	R/S	
013	76	LBL	
014	11	A	
015	99	PRT	
016	44	SUM	
017	08	08	
018	44	SUM	
019	07	07	
020	43	RCL	
021	07	07	
022	28	LOG	
023	44	SUM	
024	06	06	
025	69	OP	
026	21	21	
027	43	RCL	
028	01	01	
029	91	R/S	
030	76	LBL	
031	12	B	
032	99	PRT	
033	44	SUM	
034	07	07	
035	85	+	
036	43	RCL	
037	08	08	
038	95	=	
039	44	SUM	
040	04	04	
041	00	0	
042	42	STO	
043	08	08	
044	43	RCL	
045	04	04	
046	28	LOG	
047	44	SUM	
048	03	03	
049	69	OP	
050	21	21	
051	69	OP	
052	25	25	
053	43	RCL	
054	05	05	
055	91	R/S	
056	76	LBL	
057	13	C	
058	99	PRT	
059	85	+	
060	43	RCL	
061	07	07	
062	95	=	
063	44	SUM	
064	02	02	
065	00	0	
066	42	STO	
067	07	07	
068	43	RCL	
069	02	02	
070	28	LOG	
071	44	SUM	
072	00	00	
073	69	OP	
074	21	21	
075	69	OP	
076	29	29	
077	43	RCL	
078	09	09	
079	91	R/S	
080	76	LBL	
081	16	A'	
082	98	ADV	
083	03	3	
084	55	÷	
085	43	RCL	
086	01	01	
087	95	=	
088	42	STO	
089	09	09	
090	53	(	
091	53	(	
092	43	RCL	
093	00	00	
094	75	-	
095	43	RCL	
096	03	03	
097	54	)	
098	55	÷	
099	53	(	
100	43	RCL	
101	03	03	
102	75	-	
103	43	RCL	
104	06	06	
105	54	)	
106	54	)	
107	45	Y×	
108	43	RCL	
109	09	09	
110	95	=	
111	42	STO	
112	08	08	
113	01	1	
114	04	4	
115	69	OP	
116	04	04	
117	43	RCL	
118	08	08	
119	69	OP	
120	06	06	
121	91	R/S	
122	76	LBL	
123	17	B'	
124	53	(	
125	53	(	
126	43	RCL	
127	08	08	
128	45	Y×	
129	43	RCL	
130	05	05	
131	75	-	
132	01	1	
133	54	)	
134	33	X²	
135	35	1/X	
136	65	×	
137	53	(	
138	43	RCL	
139	03	03	
140	75	-	
141	43	RCL	
142	06	06	
143	54	)	
144	65	×	
145	53	(	
146	43	RCL	
147	08	08	
148	75	-	
149	01	1	
150	54	)	
151	54	)	
152	42	STO	
153	02	02	
154	01	1	
155	00	0	
156	45	Y×	
157	43	RCL	
158	02	02	
159	95	=	
160	42	STO	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
161	04	04		216	43	RCL					
162	01	1		217	07	07					
163	03	3		218	95	=					
164	69	OP		219	42	STO					
165	04	04		220	07	07					
166	43	RCL		221	02	2					
167	04	04		222	06	6					
168	69	OP		223	69	OP					
169	06	06		224	04	04					
170	91	R/S		225	43	RCL					
171	76	LBL		226	07	07					
172	18	C'		227	69	OP					
173	53	(		228	06	06					
174	53	(		229	91	R/S					
175	53	(		230	76	LBL					
176	43	RCL		231	19	D'					
177	06	06		232	98	ADV					
178	65	×		233	32	X:T					
179	43	RCL		234	04	4					
180	00	00		235	04	4					
181	54	)		236	69	OP					
182	75	-		237	04	04					
183	53	(		238	32	X:T					
184	43	RCL		239	69	OP					
185	03	03		240	06	06					
186	33	X²		241	42	STO					
187	54	)		242	11	11					
188	54	)		243	43	RCL					
189	65	×		244	08	08					
190	53	(		245	45	Y×					
191	43	RCL		246	43	RCL					
192	06	06		247	11	11					
193	85	+		248	95	=					
194	43	RCL		249	42	STO					
195	00	00		250	11	11					
196	75	-		251	43	RCL					
197	53	(		252	04	04					
198	02	2		253	45	Y×					
199	65	×		254	43	RCL					
200	43	RCL		255	11	11					
201	03	03		256	95	=					
202	54	)		257	65	×					
203	54	)		258	43	RCL					
204	35	1/X		259	07	07					
205	65	×		260	95	=					
206	53	(		261	32	X:T					
207	43	RCL		262	04	4					
208	09	09		263	05	5					
209	54	)		264	69	OP					
210	54	)		265	04	04					
211	42	STO		266	32	X:T					
212	07	07		267	69	OP					
213	01	1		268	06	06					
214	00	0		269	91	R/S					
215	45	Y×									

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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TEXAS INSTRUMENTS
Calculator Products Division

Submission Abstract

Program Title	Rev.
INVOICE PREPARATION	A

Abstract of Program

The program multiplies quantity times price and keeps a running total of the result. Subtotals are available at any time and mark-up or sales tax and discounts are calculated with all intermediate results printed. Designed for use with the PC-100A, a clearly identified record is printed of all computations.

Original TI-59 Program By Burks A. Smith, Lenexa, KA.

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User Benefits:

An ideal "on-line" program for businessmen, the program saves considerable time and provides a record that is easily understood and can be used directly to prepare invoices.

Category Number	Required Progs.	Prog. Steps	PC-100A Needed ☒ Library Module ID ☐
09	none	212	

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City _____ State _____ Zip _____

Submission Checklist

- ☐ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing
- ☐ _____
- ☐ _____

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TEXAS INSTRUMENTS
Calculator Products Division

Program Description

Program Title:	Rev.
INVOICE PREPARATION	A

Method, Equations, Sketches, Limitations, References, Error Recovery:

The program provides time saving steps in the simple computations that businessmen use every day, especially if they are quoting prices or figuring costs.

The quantity is multiplied by the price each for any item and the product is summed to a total memory. For a subtotal, this memory is recalled and identified with a single keystroke. Mark up or sales tax is calculated and added to the total. In the case of discounts, entering the percentage as a negative number subtracts the discount percentage from the total and prints all relevant information such as the previous subtotal, the discount (or mark up) percentage, the amount of the discount (or mark up), and the new subtotal.

When a grand total is requested, it is printed, the tape is spaced to tear off, and the program is cleared and initialized for a new problem.

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If a price is entered without entering a quantity first, the program assumes the quantity to be (1) and proceeds accordingly.

☐ See Continuation Sheet

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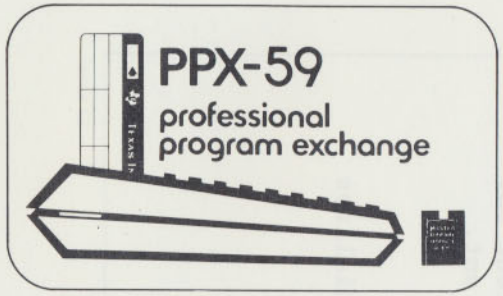

User Instructions

Program Title
INVOICE PREPARATION

QUAN	PRICE	SUBTOT	G TOT	%up/dn

Partition (OP 17): 479.59*
Parentheses Levels: 0
t Register: ☒
Angular Mode (if applicable): none req'd.
SBR Levels:
Absolute Addresses: ☐
Library Module ID:
*For TI-58 319.19
Disturbs Pending Operations: ☒

LABELS (Op 08)

INV	lnx	CE	CLR	x:t	x²
√x	1/x	STO	RCL	SUM	y^x
EE	(	)	÷	GTO	×
SBR	−	RST	+	R/S	•
+/−	=	CLR	INV	log	CP
tan	Pgm	P→R	sin	cos	CMs
Exc	Prd	|x|	Eng	Fix	Int
Deg	Pause	x=t	Nop	Op	Rad
Lbl	x≠t	Σ+	x̄	Grad	St flg
If flg	D.MS	π	List	Write	Dsz
Adv	Prt				

USER DEFINED KEYS

A	Quantity
B	Price Each
C	Subtotal
D	Grand Total
E	Mark up/down
A'	
B'	
C'	
D'	
E'	

FLAGS 0	used 1	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS		OUTPUT/MODE (see legend below)	
	enter program					
1	Enter quantity If no quantity is entered, it is assumed to be (1).	QUAN		A	QUANTITY	/n*
2	Enter price each	PRICE		B	PRICE EACH TOTAL	/(n)* /n*
3	Repeat 1, 2 as required					
4	For subtotal			C	SUBTOTAL	/n*
5	For mark up or sales tax	%		E	OLD SUBTOTAL PERCENT	/(n)* /(n)*
	For discount	%	(+/−)	E	AMOUNT NEW SUBTOTAL	/(n)* /n*
6	For Grand Total			D	GRAND TOTAL	/(n)*
	Grand total clears routine and initializes for new problem.					

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

DATA REGISTERS (INV List)

0	
1	temporary
2	subtotal
3	
4	
5	
6	
7	
8	
9	
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

☐ See Continuation Sheet

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Sample Problem

Statement of Example

Prepare an invoice for the following: 2 items @ $16.50 each and 7 items @$47.95 each. Discount 15% from the total and then add 4% sales tax.

☐ See Continuation Sheet

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ENTER	PRESS	OUTPUT/MODE (see legend below)			COMMENT
2	A	2.	QUAN	/n*	
16.5	B	16.50	AMT	/(n)*	
		33.00	TOTL	/n*	
7	A	7.	QUAN	/n*	
47.95	B	47.95	AMT	/(n)*	
		335.65	TOTL	/n*	
15 (+/-)	E	368.65	SUBT	/(n)*	
		-15	%	/(n)*	percent disc.
		-55.30	CNG	/(n)*	discount amt.
		313.35	SUBT	/n*	
4	E	313.35	SUBT	/(n)*	
		4	%	/(n)*	percent tax
		12.53	CNG	/(n)*	tax amt.
		325.89	SUBT	/n*	
	D	325.89	GTOT	/(n)*	
		0.		/disp	initializes

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

☐ Over

PPX-59 Professional Program Exchange

0	9	8	0	0	2

For TI use only

LOC	CODE	KEY	COMMENTS
000	76	LBL	
001	11	A	
002	86	STF	
003	01	01	
004	32	X:T	
005	22	INV	
006	58	FIX	
007	03	3	
008	04	4	
009	04	4	
010	01	1	
011	01	1	
012	03	3	
013	03	3	
014	01	1	
015	69	OP	
016	04	04	
017	32	X:T	
018	69	OP	
019	06	06	
020	65	×	
021	92	RTN	
022	76	LBL	
023	12	B	
024	22	INV	
025	87	IFF	
026	01	01	
027	38	SIN	
028	32	X:T	
029	22	INV	
030	58	FIX	
031	01	1	
032	03	3	
033	03	3	
034	00	0	
035	03	3	
036	00	0	
037	03	3	
038	07	7	
039	69	OP	
040	04	04	
041	58	FIX	
042	02	02	
043	32	X:T	
044	69	OP	
045	06	06	
046	95	=	
047	32	X:T	
048	22	INV	
049	58	FIX	
050	03	3	
051	07	7	
052	03	3	
053	02	2	
054	03	3	
055	07	7	
056	02	2	
057	07	7	
058	69	OP	
059	04	04	
060	32	X:T	
061	58	FIX	
062	02	02	
063	69	OP	
064	06	06	
065	44	SUM	
066	02	02	
067	22	INV	
068	86	STF	
069	01	01	
070	98	ADV	
071	92	RTN	
072	76	LBL	
073	13	C	
074	22	INV	
075	58	FIX	
076	03	3	
077	06	6	
078	04	4	
079	01	1	
080	01	1	
081	04	4	
082	03	3	
083	07	7	
084	69	OP	
085	04	04	
086	43	RCL	
087	02	02	
088	58	FIX	
089	02	02	
090	69	OP	
091	06	06	
092	98	ADV	
093	92	RTN	
094	76	LBL	
095	38	SIN	
096	42	STO	
097	01	01	
098	01	1	
099	71	SBR	
100	11	A	
101	43	RCL	
102	01	01	
103	61	GTO	
104	12	B	
105	76	LBL	
106	14	D	
107	22	INV	
108	58	FIX	
109	02	2	
110	02	2	
111	03	3	
112	07	7	
113	03	3	
114	02	2	
115	03	3	
116	07	7	
117	69	OP	
118	04	04	
119	43	RCL	
120	02	02	
121	58	FIX	
122	02	02	
123	69	OP	
124	06	06	
125	00	0	
126	42	STO	
127	01	01	
128	42	STO	
129	02	02	
130	98	ADV	
131	98	ADV	
132	98	ADV	
133	98	ADV	
134	22	INV	
135	58	FIX	
136	92	RTN	
137	76	LBL	
138	15	E	
139	22	INV	
140	58	FIX	
141	32	X:T	
142	03	3	
143	06	6	
144	04	4	
145	01	1	
146	01	1	
147	04	4	
148	03	3	
149	07	7	
150	69	OP	
151	04	04	
152	43	RCL	
153	02	02	
154	58	FIX	
155	02	02	
156	69	OP	
157	06	06	
158	22	INV	
159	58	FIX	
160	06	6	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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PPX-59 Professional Program Exchange

0 9 8 0 0 2
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LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
161	01	1									
162	69	OP									
163	04	04									
164	32	X:T									
165	69	OP									
166	06	06									
167	55	÷									
168	01	1									
169	00	0									
170	00	0									
171	95	=									
172	65	×									
173	43	RCL									
174	02	02									
175	95	=									
176	32	X:T									
177	01	1									
178	05	5									
179	03	3									
180	01	1									
181	02	2									
182	02	2									
183	69	OP									
184	04	04									
185	32	X:T									
186	58	FIX									
187	02	02									
188	69	OP									
189	06	06									
190	44	SUM									
191	02	02									
192	22	INV									
193	58	FIX									
194	03	3									
195	06	6									
196	04	4									
197	01	1									
198	01	1									
199	04	4									
200	03	3									
201	07	7									
202	69	OP									
203	04	04									
204	43	RCL									
205	02	02									
206	58	FIX									
207	02	02									
208	69	OP									
209	06	06									
210	98	ADV									
211	98	ADV									
212	92	RTN									

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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For TI use only

PPX-59
professional program exchange

TEXAS INSTRUMENTS
Calculator Products Division

Submission Abstract

Program Title	Rev.
UNIVERSAL MULTIPLE DISCOUNTER	A

Abstract of Program

It is common commercial practice to offer multiple percentage discounts off list price. For Example, "25, 10 and three 5's". This program takes the quantity, unit list price, and an unlimited number and variety of multiple discounts; and displays unit net price, total net price, and effective discount rate. For several items on one order, it also displays the overall total net price and overall effective discount rate.

Original TI-59 Program by Gordon K. Lambert, New Rochelle, N. Y.

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Datamath Calculator Museum

User Benefits:

Saves time, reduces errors and leads to better buying and selling decisions.

Category Number	Required Progs.	Prog. Steps	PC-100A Needed / Library Module ID
09		140	☐ / ☐

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Signature _____ Date _____

Name Texas Instruments Tel. No. _____

Address _____

City _____ State _____ Zip _____

Submission Checklist

- ☐ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing
- ☐ _____
- ☐ _____

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TEXAS INSTRUMENTS
Calculator Products Division

Program Description

Program Title: UNIVERSAL MULTIPLE DISCOUNTER	Rev. A

Method, Equations, Sketches, Limitations, References, Error Recovery:

An unlimited number of items may be handled, and each may be discounted at any rates any number of times.

Input Variables For Each Item:
Key A : List Price/Item or Unit
Key A': Number of Items or Units
Key B : Discount Rate in Percent
Key B': Number of Times Discount is to Apply

Output Variables For Each Item:
Key C': Effective Discount Rate
Key D : Net Price per Item or Unit
Key D': Net Price for Total Quantity of This Item

Output Variables For Total Order - All Items
Key E : Net Grand Total Price
Key E': Overall Effective Discount Rate In Percent

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NOTES: Keys B and B' must be entered in pairs, with Key B entered first. Any number of additional discounts may be entered in Keys B and B' as long as they are entered in pairs. All other keys may be entered in any order.

FORMULAE USED: $\text{Net Price} = \text{List Price} \times \left[1 - \frac{D_1}{100}\right]^{N_1} \times \left[1 - \frac{D_2}{100}\right]^{N_2}$

WHERE:
D_1 = First Discount Rate In Percent
N_1 = Number of Times First Rate Applies
D_2 = Second Discount Rate in Percent
N_2 = Number of Times Second Rate Applies

$$\text{Effective Discount Rate} = \frac{\text{List Price} - \text{Net Price}}{\text{List Price}} \times 100\%$$

Program operated in Fix 2 format. To change, alter step 002 to required format.

Flag #1 is used to allow the first discount multiplied to be stored in Register #5, and to cause all subsequent discount multipliers to multiply contents of Register #5

☐ See Continuation Sheet

0	9	8	0	0	4

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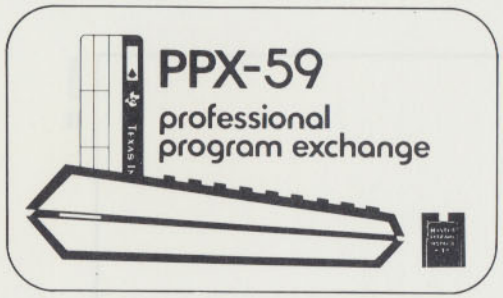

User Instructions

Program Title

UNIVERSAL MULTIPLE DISCOUNTER

No. of Items	No. of Discts.	Effec. Disc.	Total Net	Overall Effec. Disc
List Price	% Discount	Activate	Net Item	Grand Total Net

Partition (OP 17): 479.59 *

Parentheses Levels:

Angular Mode (if applicable):

SBR Levels:

Library Module ID:

*For TI-58 319.19

t Register ☐

Absolute Addresses ☒

Disturbs Pending Operations ☐

LABELS (Op 08)

INV	lnx	CE	CLR	x:t	x²
√x	1/x	STO	RCL	SUM	yˣ
EE	(	)	÷	GTO	X
SBR	−	RST	+	R/S	•
+/−	=	CLR	INV	log	CP
tan	Pgm	P→R	sin	cos	CMs
Exc	Prd	|x|	Eng	Fix	Int
Deg	Pause	x=t	Nop	Op	Rad
Lbl	x≠t	Σ+	x̄	Grad	St.flg
If flg	D.MS	π	List	Write	Dsz
Adv	Prt				

USER DEFINED KEYS

- A List Price
- B % Discount
- C Activate Program
- D Net Price/Item
- E Grand Total Net
- A No. of Items
- B No. of Disc.'s.
- C Effective Disc.
- D Total Net Price
- E Overall Effec. Disc.

FLAGS	0	x	1	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS		OUTPUT/MODE (see legend below)	
1	Clear Memories and enter Fix 2		RST	R/S	"0"	
2	Enter List Price per Item			A	List Price	n*
3	Enter Number of Items		2nd	A'	Number of Items	n*
4	First Discount Percent			B	First Discount Percent	n*
5	No. of Times First Disc. Applies		2nd	B'	No. of Times it Applies	n*
6	Second Discount Percent			B	Second Disc. Percent	n*
7	No. of Times 2nd Disc. Applies		2nd	B'	No. of Times it Applies	n*
8	Thirs Discount Percent			B	Third Discount Percent	n*
9	No. of Times 3rd Disc. Applies		2nd	B'	No. of Times it Applies	n*
10	Activate Program			C	"0"	
11	Determine Effec. Disc. Rate		2nd	C'	% Effective Discount Rate	n*
12	Determine Net Price/Item			D	Net Price Per Item	n*
13	Determine Total Net Price		2nd	D'	Total Net Price	n*
	Repeat Steps 2 Through 13 For Each Item in Order. When All Items Have Been Entered,					
14	Determine Grand Total Net Price			E	Grand Total Net Price	n*
15	Determine Overall Effec. Disc. Rate		2nd	E'	Overall Effec. Disc. Rate	n*

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

DATA REGISTERS (INV List)

0	List Price
1	No. of Items
2	Tot. Net Price
3	Grand Tot. Net
4	Grand Tot. List
5	Disc. Multiplie
6	Net Price/Item
7	Effec. Disc. %
8	
9	
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

☐ See Continuation Sheet

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TEXAS INSTRUMENTS
Calculator Products Division

Sample Problem

Statement of Example A manufacturer of Widgets quotes a jobber as follows: Fifteen Type "A" Widgets for $1000 each list, less a discount of 40%, a further discount 10%, and four further discounts of 5%.

Eleven Type "B" Widgets for $1500 each list, less a discount of 25%, a further discount of 15%, and three further discounts of 2.5%.

What is the effective discount rate for each item and for both combined?
What is the net price/item, total per type and total per order?

☐ See Continuation Sheet

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ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
	RST			
	R/S	0		
1000	A	1000.00	n*	
15	2nd A	15.00	n*	
40	B	40.00	n*	
1	2nd B	1.00	n*	
10	B	10.00	n*	
1	2nd B	1.00	n*	
5	B	5.00	n*	
4	2nd B	4.00	n*	
	C	0		Activate Program
	2nd C	56.02	n*	Effective Disc. Rate
	D	439.83	n*	Net Price/Item "A"
	2nd D	6597.50	n*	Total Net Price
1500	A	1500.00	n*	
11	2nd A	11.00	n*	
25	B	25.00	n*	
1	2nd B	1.00	n*	
15	B	15.00	n*	
1	2nd B	1.00	n*	
2.5	B	2.50	n*	
3	2nd B	3.00	n*	

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

☒ Over

PPX-59 Professional Program Exchange
Sample Problem (cont'd)

0 9 8 0 0 4
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ENTER	PRESS	OUTPUT/MODE (see legend below)		COMMENT
	C	0		Activate Program
	2nd C	40.91	n*	Effective Disc. Rate
	D	886.31	n*	Net Price/Item "B"
	2nd D	9749.40	n*	Total Net Price
	E	16346.90	n*	Grand Total Net Price
	2nd E	48.11	n*	Effective Overall Discount Rate

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

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Datamath Calculator Museum

PPX-59 Professional Program Exchange

0 9 | 8 0 0 4
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LOC	CODE	KEY	COMMENTS
000	58	FIX	
001	02	02	
002	47	CMS	
003	00	0	
004	91	R/S	
005	76	LBL	
006	11	A	
007	98	ADV	
008	99	PRT	
009	42	STO	
010	00	00	
011	91	R/S	
012	76	LBL	
013	16	A'	
014	99	PRT	
015	42	STO	
016	01	01	
017	91	R/S	
018	76	LBL	
019	12	B	
020	98	ADV	
021	99	PRT	
022	65	×	
023	93	.	
024	00	0	
025	01	1	
026	94	+/-	
027	85	+	
028	01	1	
029	95	=	
030	45	Y×	
031	00	0	
032	91	R/S	
033	76	LBL	
034	17	B'	
035	99	PRT	
036	95	=	
037	87	IFF	
038	01	01	
039	00	00	
040	47	47	
041	42	STO	
042	05	05	
043	86	STF	
044	01	01	
045	00	0	
046	91	R/S	
047	49	PRD	
048	05	05	
049	00	0	
050	91	R/S	
051	76	LBL	
052	13	C	
053	22	INV	
054	86	STF	

LOC	CODE	KEY	COMMENTS
055	01	01	
056	43	RCL	
057	00	00	
058	65	×	
059	43	RCL	
060	01	01	
061	95	=	
062	44	SUM	
063	04	04	
064	43	RCL	
065	05	05	
066	65	×	
067	43	RCL	
068	00	00	
069	95	=	
070	42	STO	
071	06	06	
072	43	RCL	
073	05	05	
074	94	+/-	
075	85	+	
076	01	1	
077	95	=	
078	65	×	
079	01	1	
080	00	0	
081	00	0	
082	95	=	
083	42	STO	
084	07	07	
085	43	RCL	
086	06	06	
087	65	×	
088	43	RCL	
089	01	01	
090	95	=	
091	42	STO	
092	02	02	
093	44	SUM	
094	03	03	
095	00	0	
096	98	ADV	
097	91	R/S	
098	76	LBL	
099	18	C'	
100	43	RCL	
101	07	07	
102	99	PRT	
103	91	R/S	
104	76	LBL	
105	14	D	
106	43	RCL	
107	06	06	
108	99	PRT	
109	91	R/S	

LOC	CODE	KEY	COMMENTS
110	76	LBL	
111	19	D'	
112	43	RCL	
113	02	02	
114	99	PRT	
115	91	R/S	
116	76	LBL	
117	15	E	
118	98	ADV	
119	43	RCL	
120	03	03	
121	99	PRT	
122	91	R/S	
123	76	LBL	
124	10	E'	
125	43	RCL	
126	04	04	
127	75	-	
128	43	RCL	
129	03	03	
130	95	=	
131	55	÷	
132	43	RCL	
133	04	04	
134	65	×	
135	01	1	
136	00	0	
137	00	0	
138	95	=	
139	99	PRT	
140	91	R/S	

MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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2 0 8 0 0 5
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PPX-59
professional program exchange

TEXAS INSTRUMENTS
Calculator Products Division

Submission Abstract

Program Title
EXPONENTIAL SMOOTHING

Rev.

Abstract of Program

This program uses double exponential smoothing to compute a trend line and make forecasts.

Original SR-52 Program by N. B. Lamb of Charleston, South Carolina

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User Benefits:

Automates a tedious calculation, thereby saving time.

Category Number 20	Required Progs.	Prog. Steps 181	PC-100A Needed ☐ Library Module ID ☐

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City _____ State _____ Zip _____

Submission Checklist

- ☐ Recorded Magnetic Cards
- ☒ Submission Abstract
- ☒ Program Description
- ☒ User Instructions
- ☒ Sample Problem
- ☒ Listing
- ☐ _____
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TEXAS INSTRUMENTS
Calculator Products Division

Program Description

Program Title: EXPONENTIAL SMOOTHING

Rev.

Method, Equations, Sketches, Limitations, References, Error Recovery:

As each data point is entered two smoothing coefficients are updated.
They are computed as follows:
S1=a * X + b * S1
S2=a * S1 + b * S2
where:
S1 and S2 are smoothing coefficients
a is alpha
b is beta or 1-a
X is the data point
The forecast is computed using the formula:
F=A + B * X
where:
F is the forecasted value
A is the value at time zero (calculations shown below)
B is the slope (calculations shown below)
X is the time to be forecasted
NOTE: Time zero is always the time of the last data point entered.
Alpha is computed as the larger of:
(1) The alpha value supplied by the user; or
(2) 1/N where N= the number of data points entered.
A and B are computed as follows:
A=2 * S1 - S2
B=a/b * (S1 - S2)
where A, B, S1, S2, a and b are defined above.

Limitations:
At least two data points must be entered before F and A may be computed.

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☐ See Continuation Sheet

2 0 8 0 0 5
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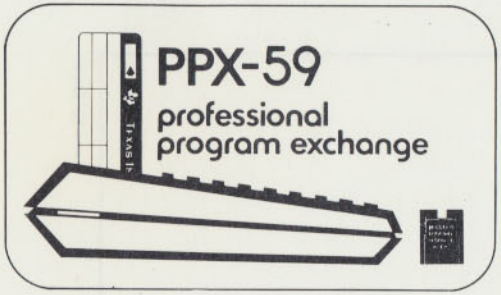

User Instructions

Program Title
EXPONENTIAL SMOOTHING

ENTER ALPHA				INIT
A0	A1	forecast		enter X

Partition (OP 17): 479.59*
Parentheses Levels: 1
t Register ☐
Angular Mode (if applicable):
SBR Levels: 1
Absolute Addresses ☐
Library Module ID:
*For TI-58 239.29
Disturbs Pending Operations ☒

LABELS (Op 08)

INV	lnx	CE	CLR	x:t	x²
√x	1/x	STO	RCL	SUM	yˣ
EE	(	)	÷	GTO	X
SBR	−	RST	+	R/S	•
+/−	=	CLR	INV	log	CP
tan	Pgm	P→R	sin	cos	CMs
Exc	Prd	|x|	Eng	Fix	Int
Deg	Pause	x=t	Nop X	Op X	Rad
Lbl	x≠t	Σ+	x̄	Grad	St flg
If flg	D.MS	π	List	Write	Dsz X
Adv	Prt				

USER DEFINED KEYS

A	Compute A0 (A)
B	Compute A1 (B)
C	Compute forecast
D	
E	Enter X
A'	Enter Alpha
B'	
C'	
D'	
E'	Initialize

FLAGS	0	1	2	3	4	5	6	7	8	9

STEP	PROCEDURE	ENTER	PRESS	OUTPUT/MODE (see legend below)	
1	Initialize		E'	0	
2	Enter alpha between 0 and 1	alpha	A'	Alpha	
3	Enter points	X (points)	E'	Counter	
4	Repeat step 4 for each point.				
5	Compute A0 (A)		A	A0*	(A0)*
6	Compute A1 (B)				
7	Compute forecast.	Period of forecast (last entry) = zero)	B C	A1* Forecasted value*	(A1)* (FCST)*

NOTES:
Steps 6 and 7 may not be used until at least two (2) points have been entered. Otherwise, steps 5, 6 and 7 may be executed at any time.

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

DATA REGISTERS (INV List)

0^0	No. of entries
0^1	Current alpha
0^2	Beta
0^3	S1
0^4	S2
0^5	A0 (A)
0^6	A1 (B)
0^7	Alpha
0^8	X
0^9	Forecast period
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

☐ See Continuation Sheet

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2 0 8 0 0 5
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Sample Problem

Statement of Example

Given the series:
1, 3, 3, 7, 5, 5, 9, 8, 8, 9 compute the next number in the series using an alpha value of .2. Also, compute A (smoothed value of last point) and B (the slope).

☐ See Continuation Sheet

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ENTER	PRESS	OUTPUT/MODE (see legend below)	COMMENT
	*E'	0.	Initialize
.2	*A'	0.2	Enter alpha
1	E	1.	Enter points
3	E	2.	
3	E	3.	
7	E	4.	
5	E	5.	
5	E	6.	
9	E	7.	
8	E	8.	
8	E	9.	
9	E	10.	
1	C	9.147861333*	(FCST)*
	A	8.654365867*	(A0)8
	B	.4934954667*	(A1)*

Modes: n* — Printed only (n) — Displayed Briefly (Pause)
(n)* — Printed and displayed

☐ Over

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LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
000	76	LBL		054	65	×		108	43	RCL	
001	15	E		055	43	RCL		109	07	07	
002	42	STO		056	04	04		110	47	CMS	
003	08	08		057	95	=		111	42	STO	
004	01	1		058	42	STO		112	07	07	
005	44	SUM		059	04	04		113	25	CLR	
006	00	00		060	43	RCL		114	91	R/S	
007	43	RCL		061	00	00		115	61	GTO	
008	00	00		062	91	R/S		116	15	E	
009	35	1/X		063	61	GTO		117	76	LBL	
010	42	STO		064	15	E		118	13	C	
011	01	01		065	76	LBL		119	42	STO	
012	43	RCL		066	11	A		120	09	09	
013	07	07		067	01	1		121	02	2	
014	75	-		068	03	3		122	01	1	
015	43	RCL		069	00	0		123	01	1	
016	01	01		070	01	1		124	05	5	
017	95	=		071	69	OP		125	03	3	
018	22	INV		072	04	04		126	06	6	
019	77	GE		073	71	SBR		127	03	3	
020	97	DSZ		074	68	NOP		128	07	7	
021	43	RCL		075	43	RCL		129	69	OP	
022	07	07		076	05	05		130	04	04	
023	42	STO		077	69	OP		131	71	SBR	
024	01	01		078	06	06		132	68	NOP	
025	76	LBL		079	91	R/S		133	71	SBR	
026	97	DSZ		080	61	GTO		134	69	OP	
027	01	1		081	15	E		135	43	RCL	
028	75	-		082	76	LBL		136	05	05	
029	43	RCL		083	12	B		137	85	+	
030	01	01		084	01	1		138	43	RCL	
031	95	=		085	03	3		139	09	09	
032	42	STO		086	00	0		140	65	×	
033	02	02		087	02	2		141	43	RCL	
034	43	RCL		088	69	OP		142	06	06	
035	01	01		089	04	04		143	95	=	
036	65	×		090	71	SBR		144	69	OP	
037	43	RCL		091	69	OP		145	06	06	
038	08	08		092	43	RCL		146	91	R/S	
039	85	+		093	06	06		147	61	GTO	
040	43	RCL		094	69	OP		148	15	E	
041	02	02		095	06	06		149	76	LBL	
042	65	×		096	91	R/S		150	68	NOP	
043	43	RCL		097	61	GTO		151	02	2	
044	03	03		098	15	E		152	65	×	
045	95	=		099	76	LBL		153	43	RCL	
046	42	STO		100	16	A'		154	03	03	
047	03	03		101	42	STO		155	75	-	
048	65	×		102	07	07		156	43	RCL	
049	43	RCL		103	91	R/S		157	04	04	
050	01	01		104	61	GTO		158	95	=	
051	85	+		105	15	E					
052	43	RCL		106	76	LBL					
053	02	02		107	10	E'					

MERGED CODES

62	Pgm	Ind	72	STO	Ind	83	GTO	Ind
63	Exc	Ind	73	RCL	Ind	84	Op	Ind
64	Prd	Ind	74	SUM	Ind	92	INV	SBR

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LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS	LOC	CODE	KEY	COMMENTS
159	42	STO									
160	05	05									
161	92	RTN									
162	76	LBL									
163	69	OP									
164	43	RCL									
165	01	01									
166	55	÷									
167	43	RCL									
168	02	02									
169	65	×									
170	53	(									
171	43	RCL									
172	03	03									
173	75	-									
174	43	RCL									
175	04	04									
176	54	)									
177	95	=									
178	42	STO									
179	06	06									
180	92	RTN									

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MERGED CODES

62 Pgm Ind	72 STO Ind	83 GTO Ind
63 Exc Ind	73 RCL Ind	84 Op Ind
64 Prd Ind	74 SUM Ind	92 INV SBR

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MARKETING/SALES

- **BREAK-EVEN POINT/MARGIN OF SAFETY**
  Computes the break-even point in units and dollars, and then computes the margin of safety given various unit and dollar sales expectations.
  TI-58 or 59.

- **PRODUCT PRICING PROGRAM**
  Performs pricing work-ups given any number of variable cost/labor/overhead inputs. Output lists pricing information followed by a listing of cost, labor, and overhead inputs.
  PC-100A/C required TI-59 only.

- **GOMPERTZ GROWTH FUNCTION CURVE FIT**
  Fits a Gompertz Growth Curve to a given set of data. Also generates forecasted values for specific inputs, and facilitates estimates of market potential.
  TI-58 or 59.

- **INVOICE PREPARATION**
  Multiplies quantity times price and keeps a running total of results. Subtotals are available at any time. Mark-up, sales tax, and discounts are calculated with all intermediate results printed.
  PC-100A/C required TI-58 or 59.

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- **UNIVERSAL MULTIPLE DISCOUNTER**
  Takes the quantity, unit list price, and an unlimited number and variety of multiple discounts; and displays unit net price, total net price, and effective discount rate.
  TI-58 or 59.

- **EXPONENTIAL SMOOTHING**
  Uses double exponential smoothing to compute a trend line and make forecasts.
  TI-58 or 59.

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(The program Code Lists must be keyed into blank magnetic cards.)

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